

# PATENT SPECIFICATION

DRAWINGS ATTACHED

837,036



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## COMPLETE SPECIFICATION

### Improvements in or relating to Staging Devices for use in Building

We, SIEMENS-BAUUNION GESELLSCHAFT MIT BESCHRANKTER HAFTUNG, a German Company of Pacellistrasse 5, Munich 2, Germany, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

10 This invention relates to staging devices to be used for the construction of concrete walls with the use of shuttering.

The invention has for its object to provide an improved construction for such staging devices which will facilitate the operations of constructing a wall, in particular the operations of placing the shuttering, pouring the concrete, placing interior reinforcements for the concrete (if any are used in the construction of the wall) in position in the poured concrete or between the shuttering prior to the pouring of the concrete, and the bringing of materials to form the wall to a convenient position on the staging.

25 The invention consists of a staging device for use in the construction of concrete walls, including an upright, means for detachably fastening said upright to a fixed support therefor with its longitudinal axis vertical, a hoisting device detachably mounted on the upright, two working platforms disposed one above the other and forming part of a unitary structure suspended from the hoisting device so as to be movable thereby up and down the upright to vary the vertical position of the platforms, and means whereby the whole of said unitary structure, including both of the working platforms forming part thereof, is guided by the upright in its upward and downward movement relatively thereto.

The invention further consists of such a staging device including shuttering for the concrete, said shuttering also forming part of said unitary structure.

[Price]

The invention further consists of a staging device as defined in the last paragraph but one, including shuttering for the concrete detachably mounted upon the upright, i.e., in contrast to forming part of the said unitary structure.

A staging device in accordance with the invention will generally include a plurality of uprights as referred to spaced from one another along the site of the wall to be constructed, said plurality carrying collectively the working platforms and other parts of the unitary structure referred to, the hoisting means and (if detachably mounted upon the uprights) the shuttering.

According to a generally preferred form of the invention, the platforms only or the platforms and the shuttering may be fastened to a carriage suspended from the hoisting device, said carriage forming part of said unitary structure.

If the platforms only are fastened to said carriage it is advantageous to fasten the shuttering to the upright or uprights in such a manner that it may easily be removed therefrom and refastened in a higher position.

Further according to said generally preferred form of the invention, the staging device includes a first pair of columns fastened to the carriage and located one on either side of the upright, and a second pair of columns spaced from, and braced to, the first pair of columns by cross members, the second pair of columns carrying a third platform and the vertical axes of the second pair of columns being contained in a plane which is parallel to the plane containing the vertical axes of the first pair of columns.

The invention will now be further described with reference to the accompanying drawings, which are to a certain extent diagrammatic and in which:

Fig. 1 is a perspective view of part of a staging device according to the invention;

Fig. 2 is a fragmentary perspective view of part of a staging device according to the invention, including two sets of spaced uprights one on either side of the site of the wall to be constructed;

Figs. 3 and 4 are respectively a fragmentary cross-sectional view and a fragmentary side elevational view of a form of staging device in accordance with the invention in which two sets of spaced uprights are employed, one on either side of the site of the wall to be constructed and in which the shuttering is fastened to the uprights;

Figs. 5 and 6 are fragmentary views of a form of staging in accordance with the invention employing first and second pairs of columns as hereinbefore referred to, Fig. 5 showing the pairs in closely spaced position relatively to one another and Fig. 6 the same pairs in widely spaced position;

Fig. 7 is a fragmentary cross-sectional view through a form of staging in accordance with the invention for the construction of two walls simultaneously, the staging device including therefore two sets of uprights, hoisting devices and working platforms, the two sets being associated with a supplementary staging structure for supporting a materials hoist common to the two sets of working platforms; and

Fig. 8 is a fragmentary side elevational view of the structure illustrated in Fig. 7.

Like reference characters are applied to like parts in the various figures.

Referring first to the form of the invention illustrated in Fig. 1, the upright T appearing in the figure, which upright is as shown of H girder form, is detachably fastened to one side of a completed portion of a concrete wall W. Shaped bricks  $s_1$  and  $s_2$  inserted into the concrete at predetermined distances form fastening means, to which the upright may be bolted or otherwise attached. As the construction of the wall proceeds, the upright T may easily be removed from the bricks  $s_1$  and  $s_2$  and fastened again in a higher position, so that only a few uprights are required for a staging device according to the invention.

The upright T is used as a guide for a carriage GW designed to be hoisted up and down the upright.

A lower platform B and shuttering  $ST_1$  are fastened to the carriage GW, which latter is suspended from an hydraulic hoisting device H by means of a hook h. The hoisting device is detachably mounted on the upright T, for which purpose the upright is provided with a plurality of apertures o located at spaced positions along the upright. The hoisting device may be mounted on the upright at any of these positions, with the result that its height from the ground is variable. The design and the method of operation of the hoisting device

are known *per se* and do not form part of the invention.

A pair of channels  $u_1$  and  $u_2$  are fastened to the carriage GW in such a manner that one channel is located on one side of the upright T and the other on the other side thereof. A second pair of channels  $u_3$  and  $u_4$  are spaced from and braced to the channels  $u_1$  and  $u_2$  by cross-members. In the embodiment of the invention illustrated, said cross members comprise horizontally disposed members  $v_1$  to  $v_4$  and diagonally disposed members  $v_5$  and  $v_6$  incorporating screw bolts whereby they are of variable length and can be tightened to make the bracing of the two pairs of channels rigid. The vertical axes of the channels  $u_3$  and  $u_4$  are contained in a plane parallel to the plane containing the vertical axes of the channels  $u_1$  and  $u_2$ .

The channels  $u_1$  and  $u_2$  constitute the "first pair of columns" and the channels  $u_3$  and  $u_4$  the "second pair of columns" hereinbefore referred to.

A platform BB, suitably spaced in the upward direction from the platform B, is carried by the channels  $u_1$  and  $u_2$ , while the channels  $u_3$  and  $u_4$  carry two further platforms  $B_1$  and  $BB_1$  at heights corresponding to the heights of the platforms B and BB respectively. Shuttering  $ST_2$  is also fastened to the channels  $u_3$  and  $u_4$ .

The platforms consist of beams covered by boards and gaps are left between the platforms for tipping a concrete mixture into the space between the shuttering  $ST_1$  and  $ST_2$ , and for inserting reinforcing rods into said space. Vertically extending reinforcement rods may be inserted into said space from the upper platforms BB and  $BB_1$ , while horizontally extending reinforcing rods may be inserted from the lower platforms B and  $B_1$ . The concrete mixture is tipped into the space from the lower platforms.

The shuttering  $ST_1$  is braced by beams  $b_1$  and  $b_2$ , while the shuttering  $ST_2$  is braced by beams  $b_3$  and  $b_4$ . The beams are fastened to the channels  $u_1$  and  $u_2$  or  $u_3$  and  $u_4$  respectively, and thus indirectly to the carriage GW. In the embodiment of the invention illustrated the vertical axes of the channels  $u_2$  and  $u_1$  are contained in a plane parallel to the plane containing the vertical axes of the channels  $u_4$  and  $u_3$ .

In the embodiment of the invention illustrated in Fig. 2 there are arranged two uprights  $T_1$  and  $T_2$ , one on either side of the concrete wall W. A carriage GW is suspended from each upright. The two carriages are identical and only one appears in the figure, the other having been omitted for the sake of clearness of illustration of the invention. The upper platforms BB and  $BB_1$  are supported on the respective carriages through the intermediary of suitable con-

necting structures including struts, some only of which appear in the figure, marked  $X_1, X_2, X_3$ , said connecting structures being adapted rigidly to connect the platforms to the respective carriages. The platforms BB and B and the shuttering  $ST_1$  on one side of the wall are supported from the corresponding upright  $T_1$ , and the platforms  $BB_1$  and  $B_1$  and the shuttering  $ST_2$  on the other side of the wall from the upright  $T_2$ . Such an arrangement may be essential in some instances.

In the embodiment of the invention illustrated in Figs. 3 and 4 the uprights  $T_1$  and  $T_2$  are arranged (see Fig. 3) on either side of the concrete wall  $W$ . The carriages  $GW$  are guided along these uprights. As in the embodiment illustrated in Fig. 2, the two sets of platforms  $B, BB$  and  $B_1, BB_1$  are carried separately on the respective uprights  $T_1, T_2$ . The shutterings  $ST_1$  and  $ST_2$  are not fastened to the carriages or the platforms, but are removably fastened to the uprights by suitable fastening means  $m$ . The shutterings are brought into position and adjusted from the lower platforms  $B$  and  $B_1$ , while the reinforcement rods are inserted from the upper platforms  $BB$  and  $BB_1$ . After the concrete mixture has been tipped into the space between the shutterings and as soon as the concrete has set sufficiently, the shuttering is detached by workmen operating on the lower platforms  $B, B_1$ , the platforms are raised by hoisting the carriages  $GW$  a distance corresponding to the height of the shuttering and finally, the shuttering previously detached is again put into position from the lower platforms.

If a staging device including two sets of uprights as illustrated in Figs. 2, 3 and 4 is used, it is easy to adjust the platforms and the shutterings to suit walls of different thicknesses. If, however, an arrangement including one set only of uprights (as in Fig. 1) is used, the space between the platforms and the shutterings located on opposite sides of the wall should, preferably, be adjustable to suit the thickness of the wall. This may be achieved, in an arrangement as illustrated in Fig. 1, very simply by using cross-members between the first and second pairs of channels  $u_1, u_2$  and  $u_3, u_4$  which are adjustable in length or effective length. The horizontal cross-members  $v_1$  to  $v_4$  may be rendered adjustable in their effective length by providing them with a plurality of spaced holes along their lengths into any of which connecting bolts may be inserted for fastening the cross-members to the channels. Fig. 5 illustrates the two channels  $u_1$  and  $u_3$  brought so close to each other by the cross-members  $v_1$  and  $v_3$  that the shutterings fastened to the channels are spaced from one another by a distance which corresponds to the smallest possible wall thickness  $w$ . A

corresponding adjustment of the length of the diagonal cross-member  $v_2$  is effected by turning the screw bolt  $s, p$  incorporated therein. For increasing the space between the channels  $u_1$  and  $u_3$  to suit a thicker wall (Fig. 6) the distance between the channels  $u_1$  and  $u_3$  is extended by using holes in the members  $v_1$  and  $v_3$  which are more widely spaced. It will be seen that the diagonal cross-member  $v_2$  is not removed from the channels  $u_1$  and  $u_3$ , its effective length being adjustable merely by turning the screw bolt  $s, p$ .

In the embodiment of the invention illustrated in Figs. 7 and 8 two parallel concrete walls  $W$  are under construction. For this purpose two staging devices of the kind illustrated in Fig. 1, each with two vertical girders, are used and a superstructure for carrying a materials hoist is supported and braced to the upper platforms of these devices. The uprights  $T_a$  and  $T_b$  of the staging devices are fastened to the respective walls  $W, W$ . Each of these uprights carries a carriage  $GW$ , two pairs of platforms  $B, B_1$  and  $BB, BB_1$ , shuttering  $ST_1, ST_2$  and a supporting structure for the platforms whereby the latter and the shuttering are connected to the carriage  $GW$  so as to be supported thereby for movement up and down the upright  $T_a$  or  $T_b$ , all as in the embodiment of the invention illustrated in Fig. 1. Mounted upon the upper platforms  $BB, BB_1$  are four supports  $P$  braced together by a horizontal beam  $B_2$ , a horizontal cross-member  $p$  and two inclined bracing members  $p, p$ . These parts form the superstructure above referred to, it being understood that, as shown in Fig. 8, said superstructure comprises two sets of parts as referred to located between two adjacent sets of uprights  $T_a, T_a$  and  $T_b, T_b$ , the supports  $P, P$  of the respective sets being braced (longitudinally of the walls) by further beams  $B_3$  and further bracing members  $p_2$ . Hoist pulleys  $R$  for lifting a container  $K$  are mounted on the superstructure. If such an arrangement is used, it is essential, of course, to raise the two staging devices on the two walls  $W$  simultaneously, because the two devices are rigidly joined through the hoist frame arranged across them; such rigid connection of the devices increases the mechanical strength and loading capacity of the two combined devices.

#### WHAT WE CLAIM IS:—

1. A staging device for use in the construction of concrete walls, including an upright, means for detachably fastening said upright to a fixed support therefor with its longitudinal axis vertical, a hoisting device detachably mounted on the upright, two working platforms disposed one above the other and forming part of a unitary structure suspended from the hoisting device so as to

be movable thereby up and down the upright to vary the vertical position of the platforms, and means whereby the whole of said unitary structure, including both of the 5 working platforms forming part thereof, is guided by the upright in its upward and downward movement relatively thereto.

2. A staging device according to Claim 1, including shuttering for the concrete, said 10 shuttering also forming part of said unitary structure.

3. A staging device according to Claim 1, including shuttering for the concrete detachably mounted upon the upright.

4. A staging device according to Claim 2, wherein the platforms and the shuttering are 15 fastened to a carriage suspended from the hoisting device, said carriage forming part of said unitary structure.

5. A staging device according to Claim 3, wherein the platforms are fastened to a 20 carriage suspended from the hoisting device, said carriage forming part of said unitary structure, and wherein the shuttering is removably fastened to the upright.

6. A staging device according to Claim 4 or Claim 5, including a first pair of columns 30 fastened to the carriage and located one on either side of the upright and a second pair of columns spaced from, and braced to, the first pair of columns by cross-members, the second pair of columns carrying a third platform, and the vertical axes of the second 35 pair of columns being contained in a plane which is parallel to the plane containing the vertical axes of the first pair of columns.

7. A staging device according to Claim 6, wherein the vertical axes of a first column of 40 the first pair of columns and of a first column of the second pair of columns are contained in a plane parallel with the plane containing the vertical axes of the second column of the first and second pairs of columns.

8. A staging device according to Claim 7, wherein the cross-members extend between 45 the said first columns and between the said second columns.

9. A staging device according to Claim 8, 50 wherein at least two horizontal cross-members arranged at different heights extend between said first columns, and wherein at least two horizontal cross-members arranged

at different heights extend between said 55 second columns.

10. A staging device according to any of the Claims 6 to 9, wherein at least some of the cross-members incorporate screw bolts 60 so as to be of adjustable effective length.

11. A staging device according to Claim 60 10, wherein the cross-members incorporating screw bolts extend at an angle to the horizontal between said first columns and between said second columns.

12. A staging device according to any of 65 the Claims 6 to 11, wherein the distance between the first pair of columns and the second pair of columns is adjustable.

13. A staging device according to Claim 4 70 or Claim 5, including two spaced uprights located respectively on either side of the site of the wall to be constructed, wherein a carriage is suspended by means of a hoisting device from each of said uprights, wherein 75 one lower platform located on one side of said site is fastened to the one carriage, while another lower platform located on the other side of said site is fastened to the other carriage, and wherein each lower platform supports an upper platform disposed 80 vertically above it.

14. A staging device according to Claim 13, wherein each upright is used for guiding 85 the associated upper platform.

15. Two staging devices each according to 85 any of Claims 1 to 14, said staging devices being allocated respectively to two separate walls to be constructed located in laterally spaced relation to one another, wherein a 90 superstructure for supporting a materials hoist is mounted upon and braced to the upper platforms of the two staging devices.

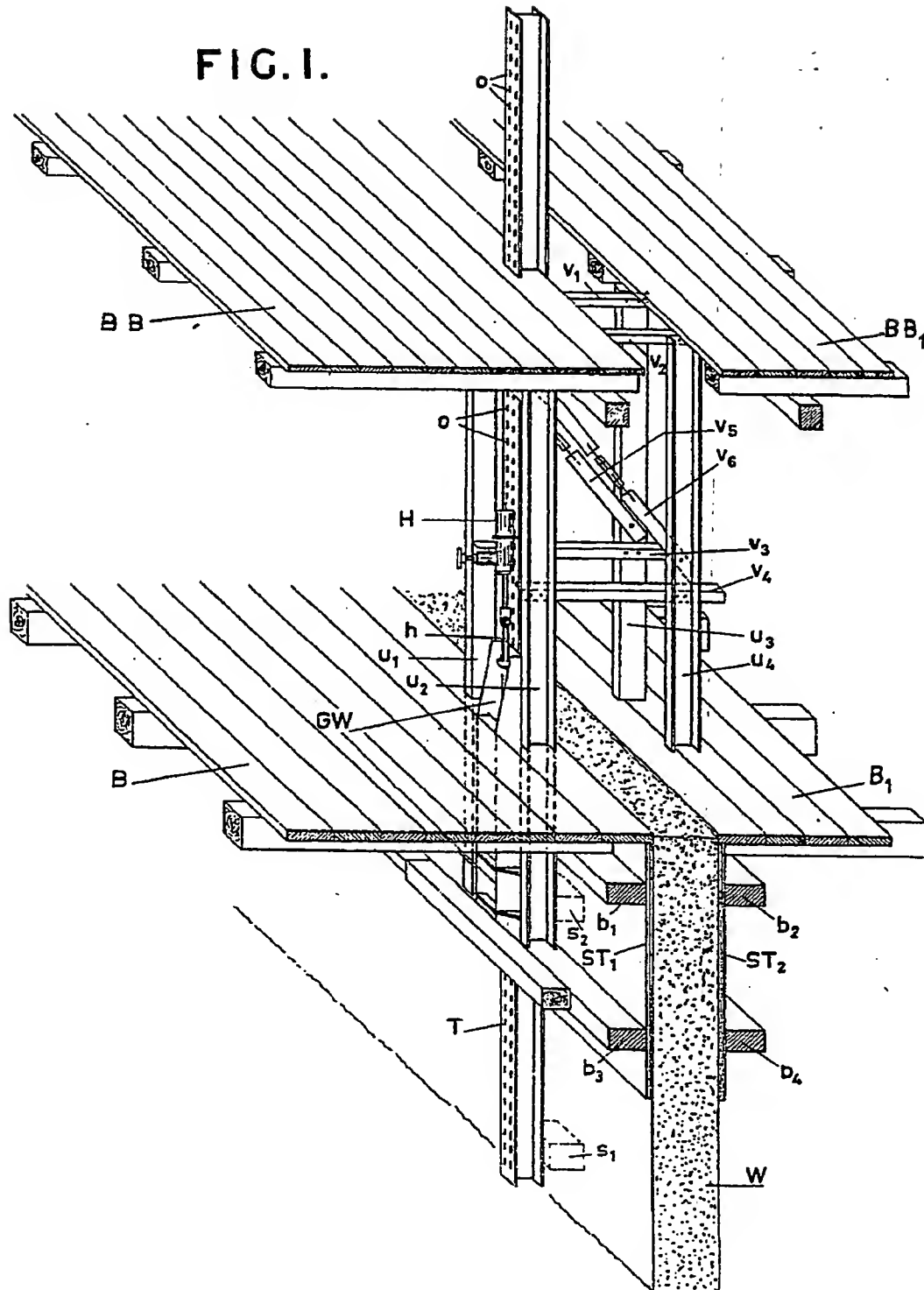
16. A method of using a staging device 95 according to Claim 6 or any claim dependent thereon, wherein the first pair of columns is located on one side of a concrete wall under construction and the second pair of columns is located on the other side of said wall.

17. A staging device for use in the construction of concrete walls, constructed and 100 arranged substantially as herein described with reference to the accompanying drawings.

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FIG. I.



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B

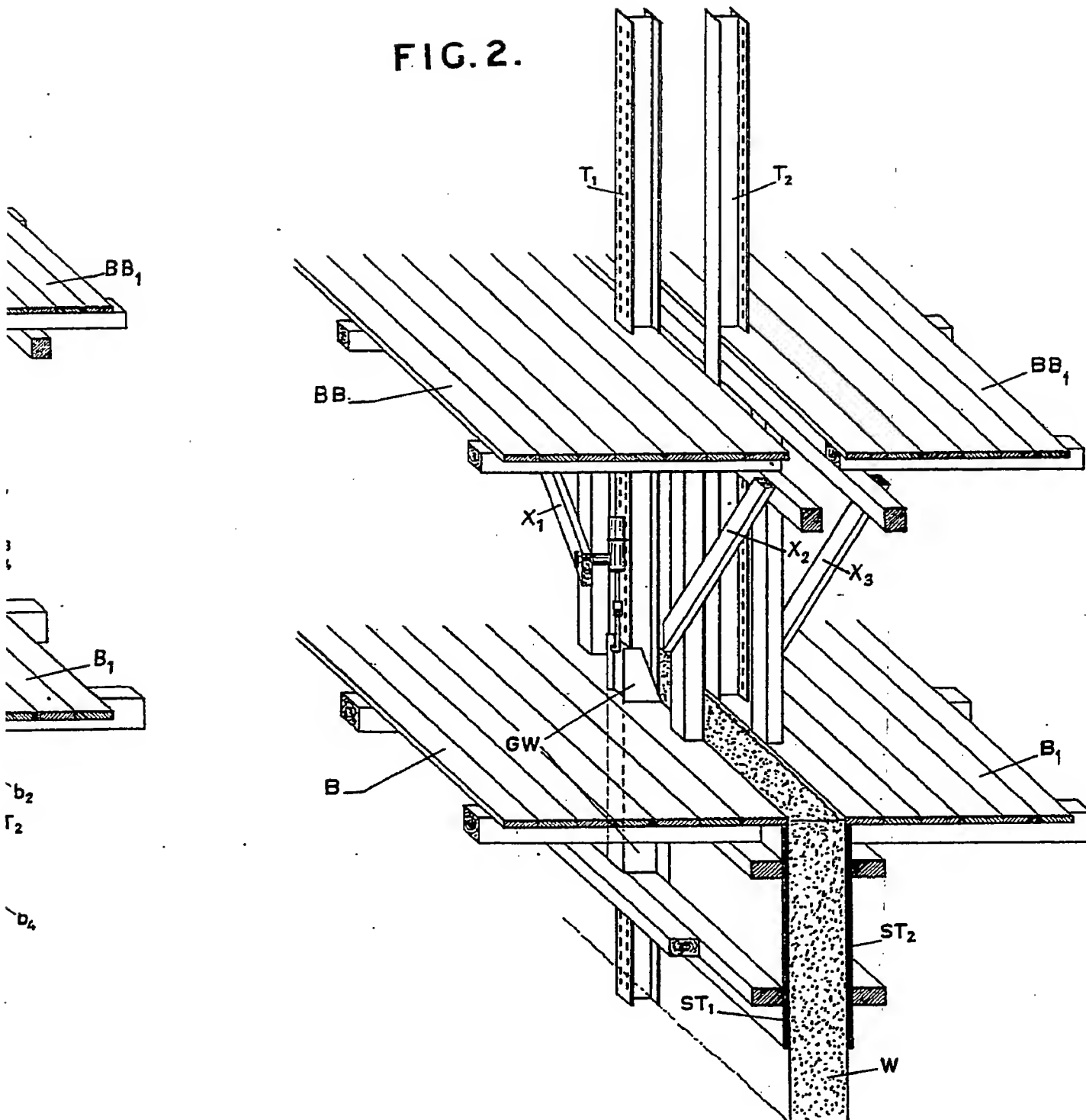
6 SHEETS

## COMPLETE SPECIFICATION

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**SHEETS 1 & 2**

**FIG. 2.**



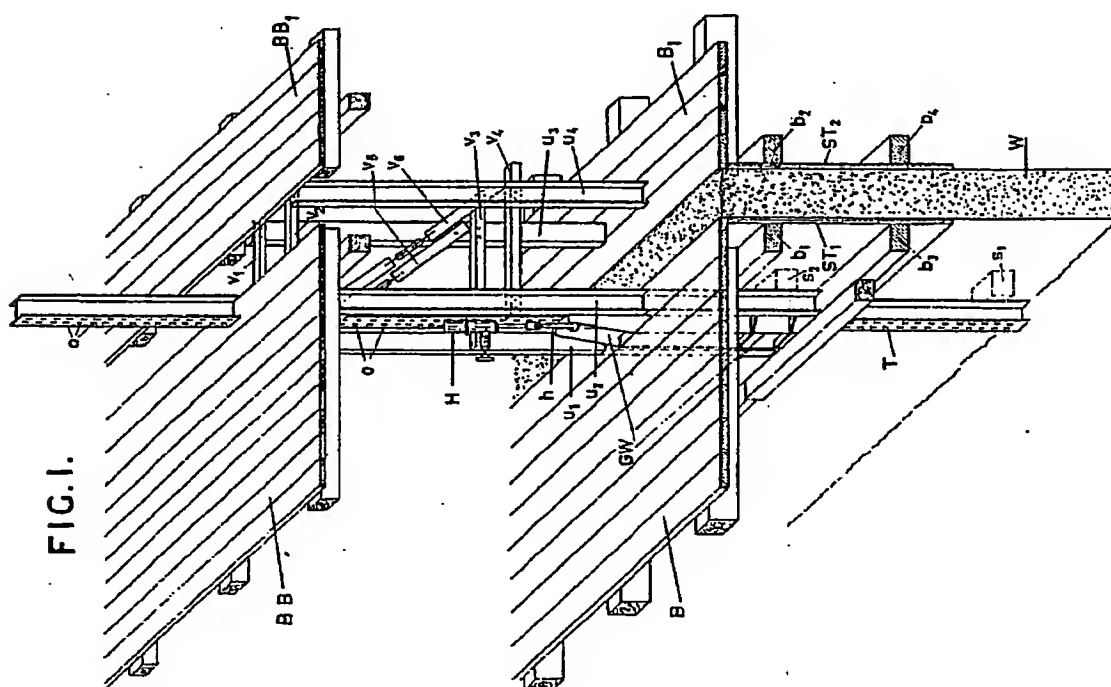
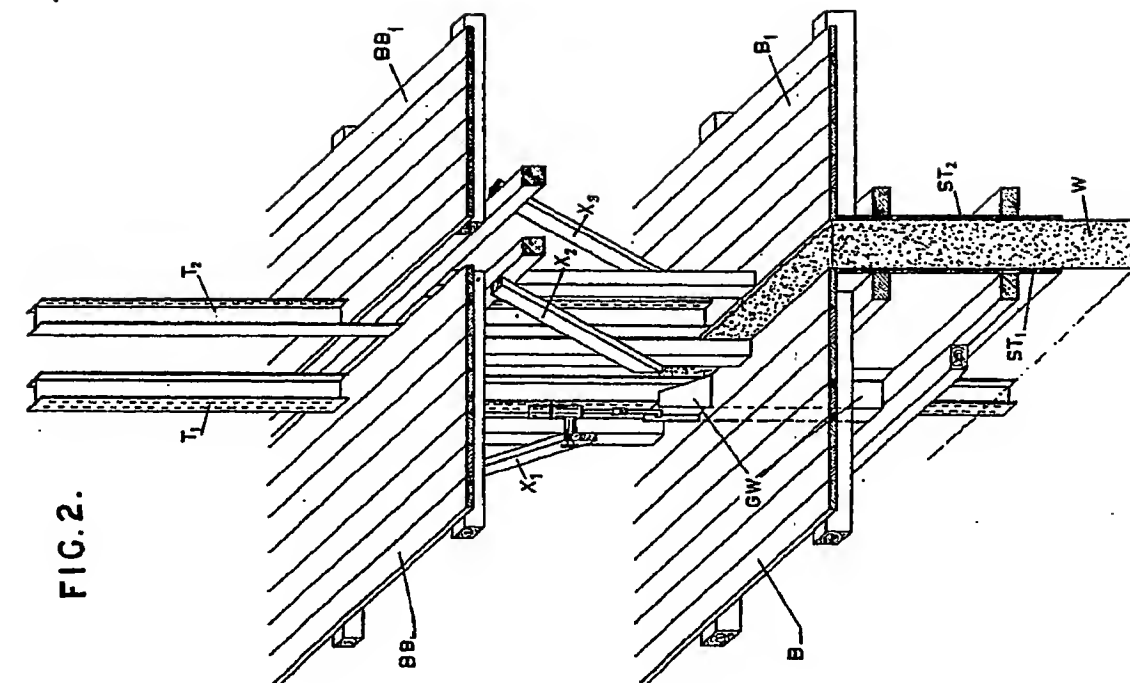


Fig.3

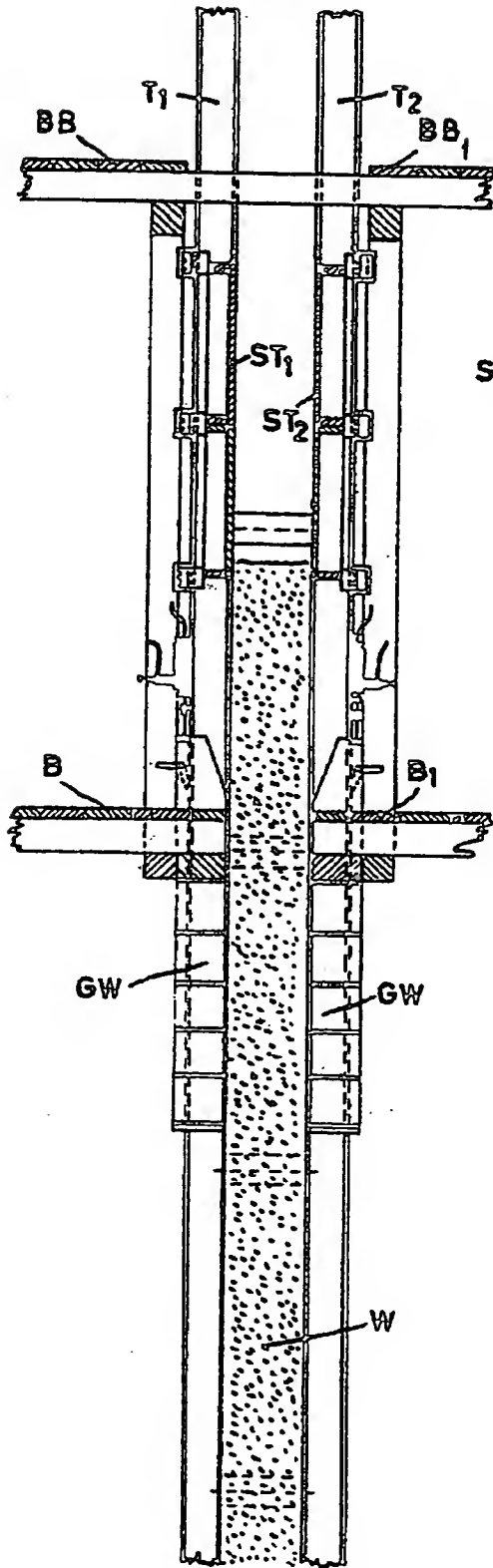
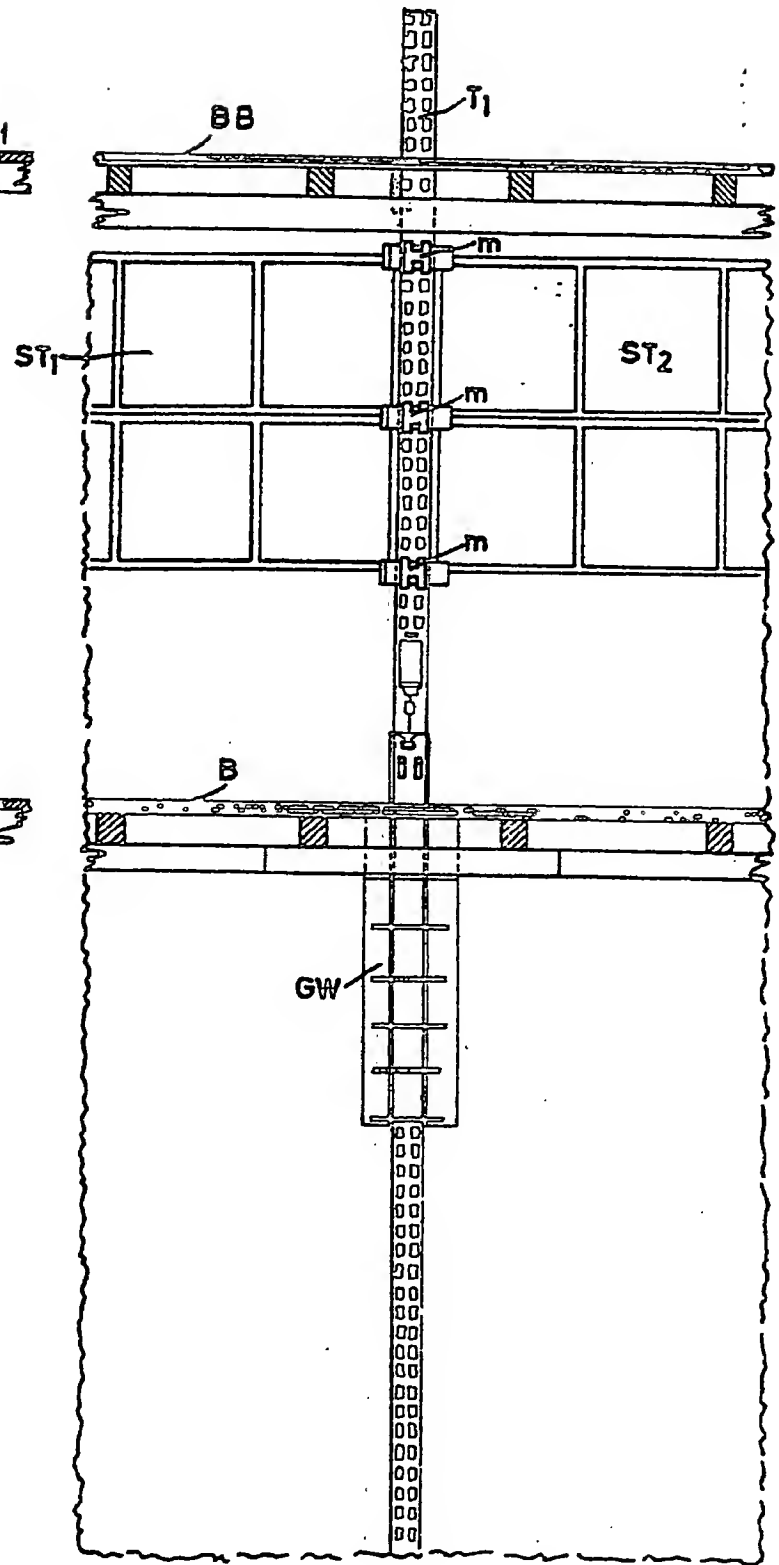


Fig.4





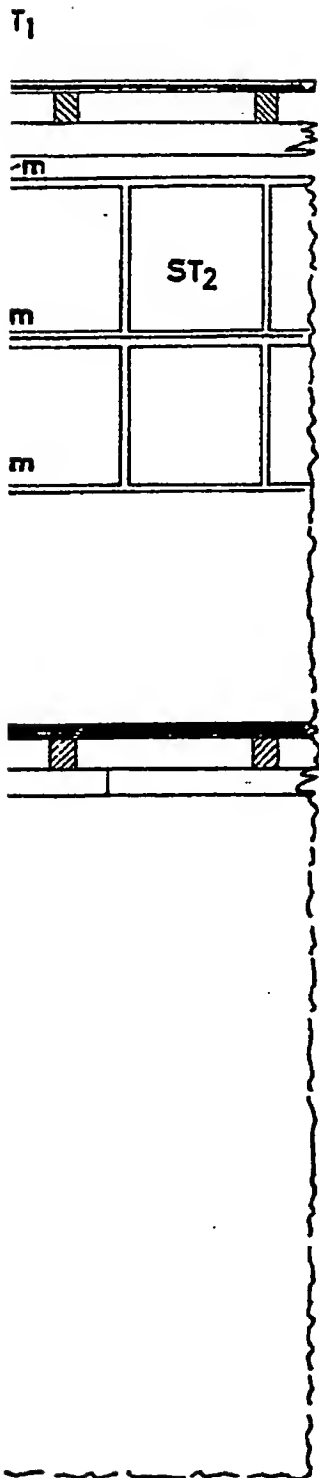


FIG. 5.

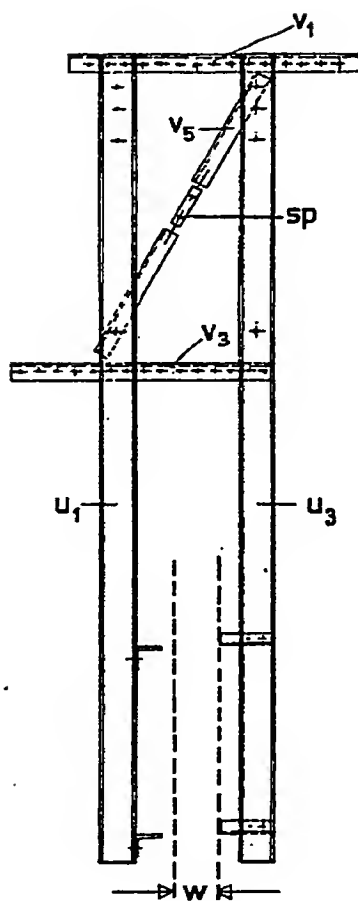
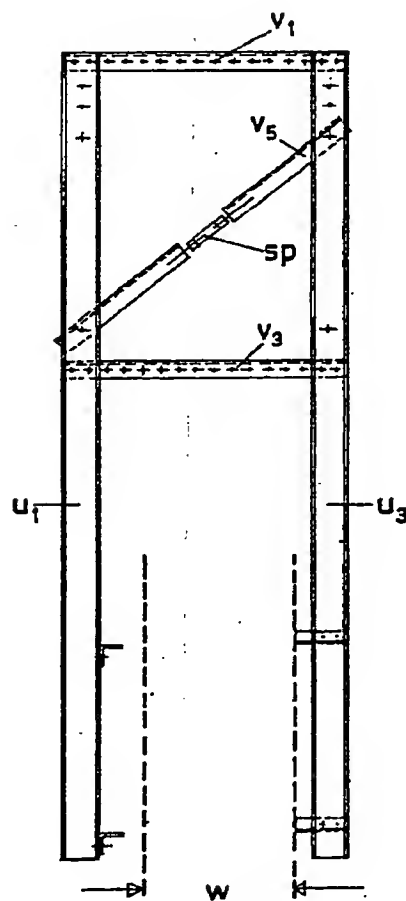


FIG. 6.



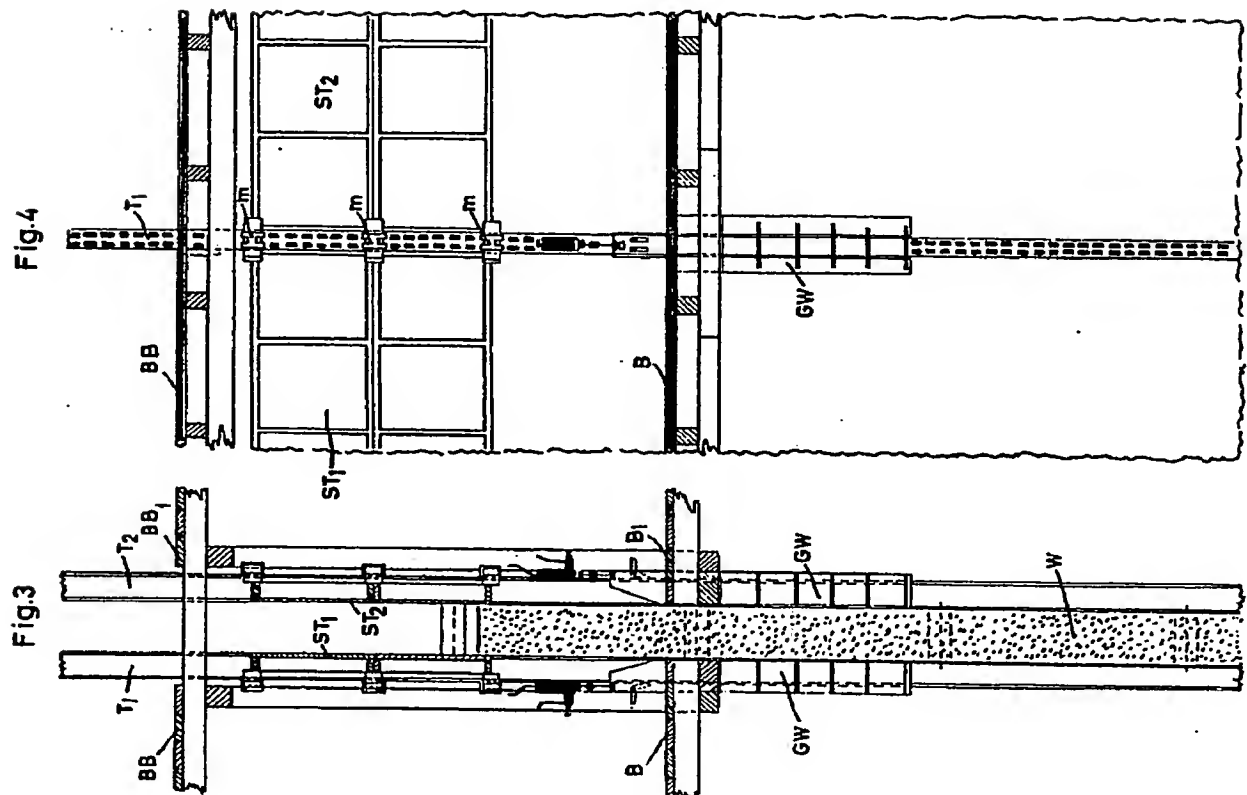


FIG. 5.

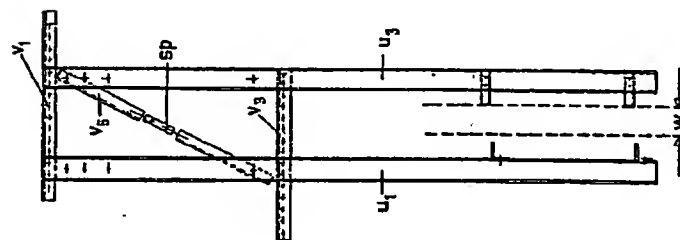


FIG. 6.

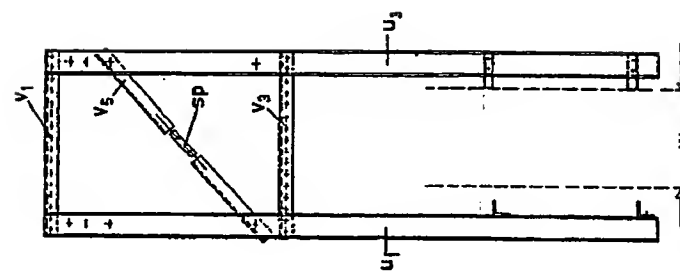


FIG. 7.

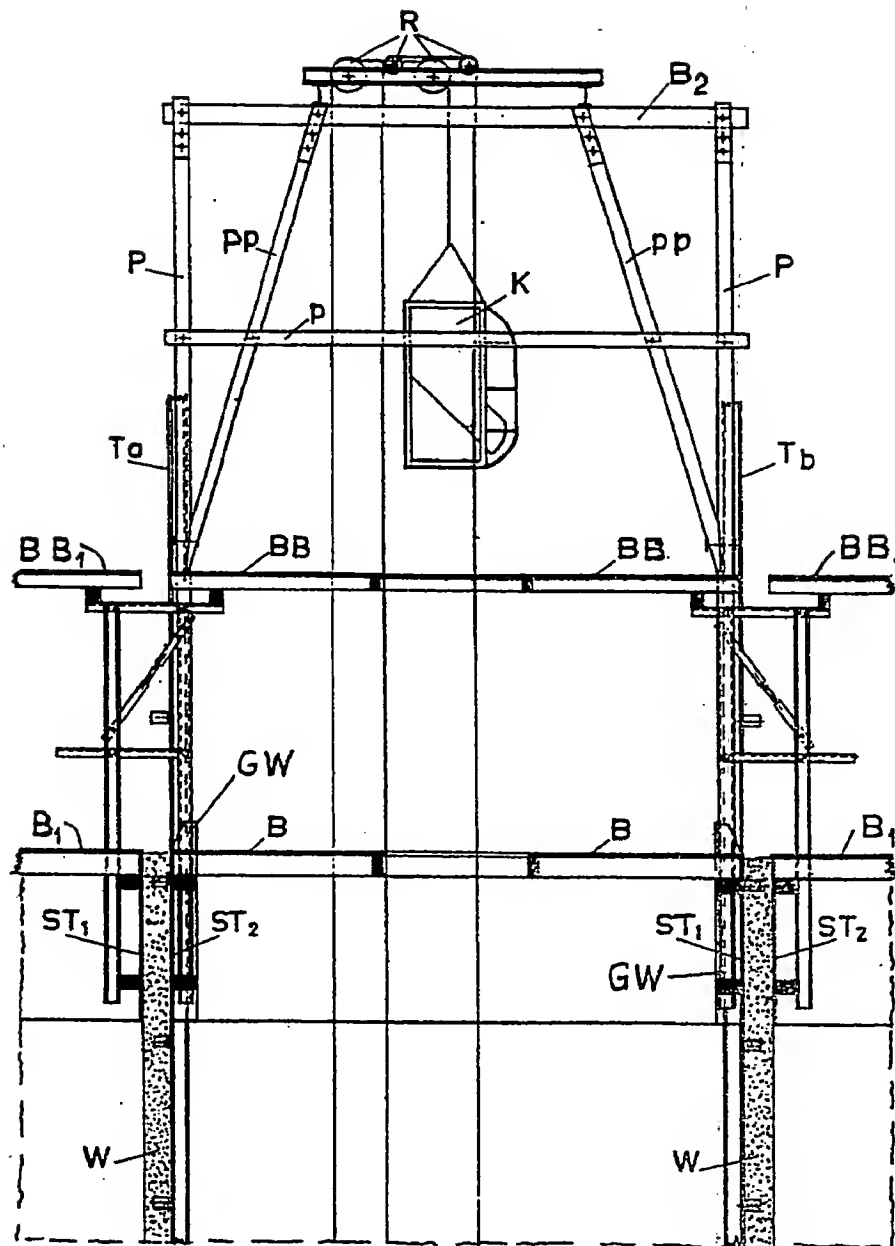
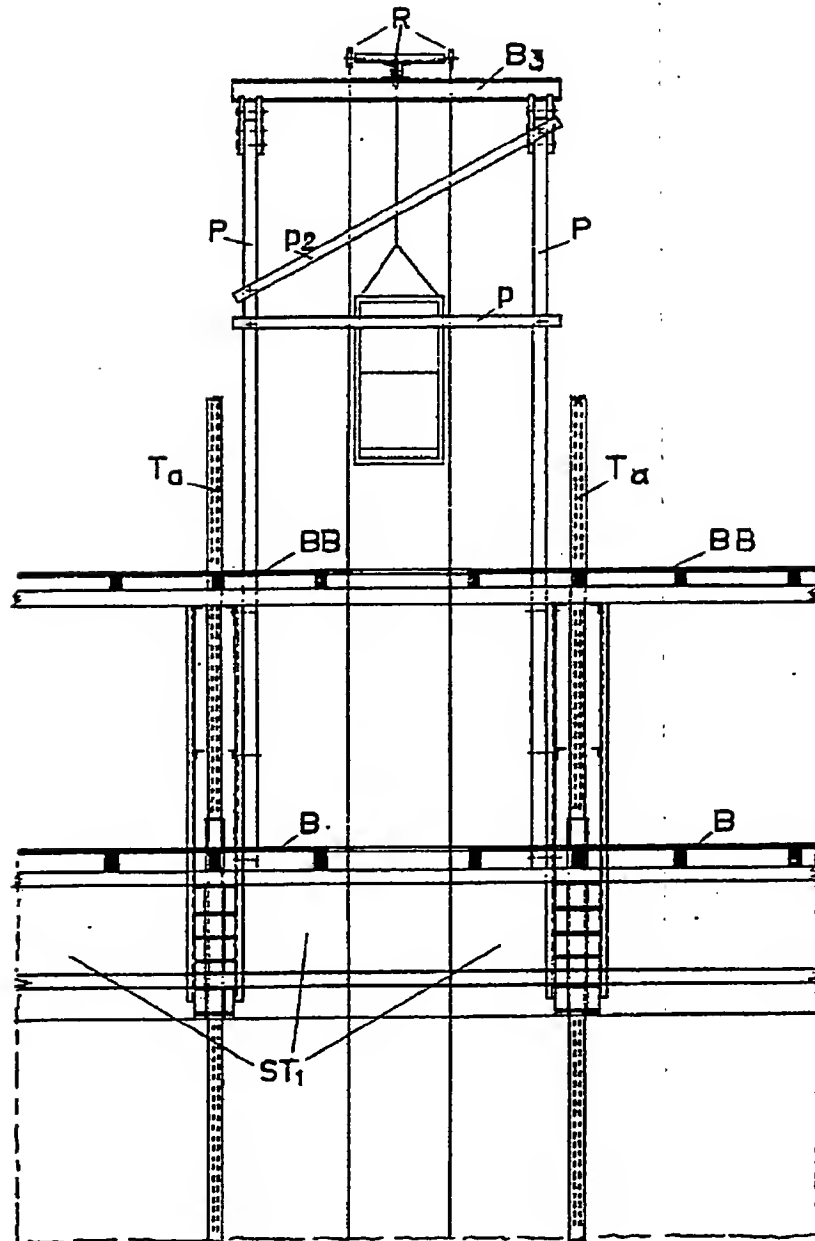


FIG. 8.



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 the Original on a reduced scale.  
 SHEETS 5 & 6

FIG. 7.

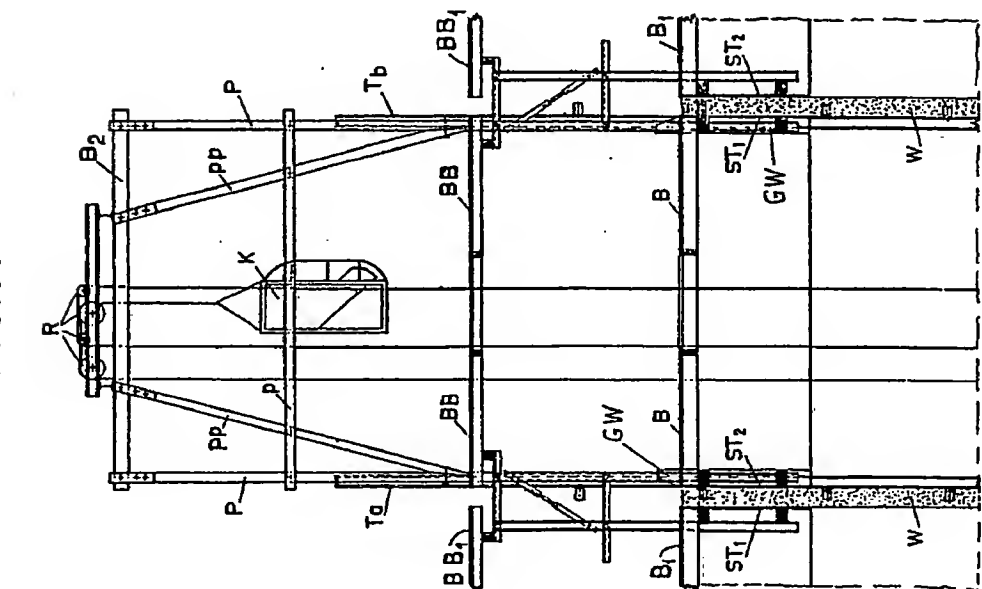


FIG. 8.

